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Indian Standard

**GUIDE FOR PAPER SPOILAGE AND WASTAGE
FOR PRINTING INDUSTRY**

PART 1 SHEETFEED LETTERPRESS AND OFFSET PROCESSES

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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Indian Standard

GUIDE FOR PAPER SPOILAGE AND WASTAGE FOR PRINTING INDUSTRY

PART 1 SHEETFEED LETTREPRESS AND OFFSET PROCESSES

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Indian Standard

GUIDE FOR PAPER SPOILAGE AND WASTAGE FOR PRINTING INDUSTRY

PART 1 SHEETFEED LETTERPRESS AND OFFSET PROCESSES

0. FOREWORD

0.1 This Indian Standard (Part 1) was adopted by the Indian Standards Institution on 25 March 1987, after the draft finalized by the Publications and Graphic Technology Sectional Committee had been approved by the Executive Committee.

0.2 In printing, binding and other operations, overs should be added to the base quantity of printable papers and boards to allow for make ready, spoilage, etc. The quantity will depend upon the number of colours or workings, closeness of register, length of run, etc and it should include additional allowance for operations like ruling, perforating, numbering, die stamping, overprinting, punching, varnishing, lamination/graining and any additional binding processes or cutwork.

0.2.1 It should be noted that before the job is ready for continuous running, a fixed number of sheets are usually spoiled during the process of make-ready, etc regardless of the length of run. Once the machine is set in motion, possible wastage of paper during manufacturing process is considerably reduced and is limited to certain mechanical defects/deficiencies and/or adjustments on machines or to use of materials like ink, paper, plates, etc. Adequate quality control measures, proper maintenance of machinery and competent workers are the factors which reduce wastage of paper to the absolute minimum under normal conditions. In colour work, the allowance must be sufficient to cover wastage due to bad register, defective colour, set off, etc. All this means additional sheets to the base (printable) quantity.

0.3 Besides the above, paper gets damaged due to handling during the course of transit from the suppliers to the printers as also during storage. Therefore, proper packaging of paper and board should conform to IS : 6221-1971*.

*Code of practice for packaging of paper and board.

0.4 It is necessary to have standard norms for arriving at the admissible spoilage or wastage that has to be allowed for various printing and production jobs which at present is based only on understanding between the print buyers and print sellers (printers).

0.5 This standard provides a formula for calculating the spoilage allowance for paper for letterpress and offset printing processes using sheetfed machines. In arriving at this formula, the types of jobs, quality-wise and quantity-wise as also the interests of printers, print buyers and paper manufacturers and various economic considerations have been kept in view.

0.6 In the preparation of this standard, assistance has been taken from the following:

Spoilage Formula — Allowance for spoilage and overs in printing industry, 1976. The All India Federation of Master Printers, New Delhi.

Estimating for printers, 9 Ed Revised, 1977. British Printing Industries Federation, London.

0.7 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard (Part 1) prescribes the minimum overs that should be added to the base (printable) quantity of paper needed for a particular job to be printed by sheetfed letterpress and offset processes.

1.2 This wastage formula should not be applied to paper below 48 gsm including tissue paper, speciality paper and air mail paper since additional wastage is justified for printing on these papers. Wastage formula for such papers could be mutually decided between the printer and the print buyer.

2. TERMINOLOGY

2.1 Spoilage/Wastage — Unprofitable materials and labour, the cost of which is not usually charged to a specific customer.

2.2 Make-ready — Make-ready operations are all the operations which are necessary to make the forme print worthy for continuous running,

*Rules for rounding off numerical values (revised).

2.3 Fixed Wastage — The wastage involved in make-ready process prior to running on.

2.4 Running Wastage — The wastage which occurs during running on subsequent to make-ready.

2.5 Printable Quantity — Paper may get damaged due to handling during transit and also during storage. Printable quantity of paper would be the actual quantity of paper available to the printer for carrying out the printing. This may be different from the normal number of sheets in a standard ream/packet. The printable quantity of paper would not include paper that may be damaged during handling, transportation and storage prior to the receipt of paper by the printer.

2.6 Working Sheet — Working sheet is the actual size of paper being used on the machine for printing.

2.7 Common Work — Work of average quality such as commonly used forms, cheaper additions of books, hand bills, etc, normally printed in single colour.

2.8 Close Registration Work — Work of high quality, generally printed in multi-colours, containing process colour pictures and illustrations requiring dot-to-dot registration between each colour and high degree of sharpness of image and uniformity of inking and impression throughout the print run.

3. RATIONALE FOR COMPUTING PAPER SPOILAGE ALLOWANCE

3.1 The rationale in adopting the formulae for paper spoilage envisages the following:

- a) A fixed number of sheets (if irreducible, minimum number) are required at initial stages for various operations like make-ready, regardless of the quantity to be printed;
- b) Paper spoilage depends on the extent and nature of work;
- c) Wastage of sheet occurs during running/manufacturing process on account of some defects/deficiencies/adjustments on impressions, paper stock or material;

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- d) The larger the overall number of copies printed, the lesser is the percentage of spoilage in any continuous print job;
- e) There is a progressive increase in the total number of working sheets towards allowance for spoilage with increase of print order in different slabs;
- f) The spoilage allowance shall be computed on the basis of fixed number of working sheets for minimum make-ready and for the initial print order of 1 000 copies and fixed percentage using slab system for the running waste per colour, per side, for subsequent print order;
- g) Extra spoilage for every additional operation like perforating, varnishing, numbering, etc, shall be provided;
- h) Wherever machine proofs are required, additional wastage on the basis of minimum make-ready shall be provided; and
- j) Spoilage allowance shall be computed on printable quantity of paper.

3.1.1 Allowable wastage for sheetfed letterpress process and offset process has been explained in 4.

4. ALLOWABLE WASTAGE—SHEETFED LETTERPRESS/OFFSET PROCESS

4.1 Tables 1 and 2 give the allowable wastage per side per colour to be added to the base quantity of paper in case of sheetfed letterpress/offset process using the slab system.

TABLE 1 ALLOWABLE WASTAGE, PER SIDE, PER COLOUR FOR COMMON WORK SHEET FED LETTERPRESS PROCESS

(Clause 4.1)

SLAB No.	NO. OF IMPRESSIONS	ALLOWABLE WASTAGE, WORKING SHEETS
(1)	(2)	(3)
1	Up to 1 000	25
2	1 001 - 5 000	25+2.0 percent of slab 2
3	5 001 - 10 000	25+2.0 percent of slab 2 + 1.25 percent of slab 3
4	10 001 - 25 000	25+2.0 percent of slab 2 + 1.25 percent of slab 3 + 1.0 percent of slab 4
5	25 001 - 50 000	25+2.0 percent of slab 2 + 1.25 percent of slab 3 + 1.0 percent of slab 4 + 0.75 percent of slab 5
6	50 001 onwards	25+2.0 percent of slab 2 + 1.25 percent of slab 3 + 1.0 percent of slab 4 + 0.75 percent of slab 5 + 0.5 percent of slab 6

*Example :**Spoilage Allowance for Common Work (Sheetfed Letterpress Process)*

No. of impressions : 32 000

Up to 1 000 impressions : 25 working sheets
(including make-ready)For additional 4 000 impressions : 80 working sheets
(2.0 percent)For additional 5 000 impressions : 62.5 working sheets
(1.25 percent)For additional 15 000 impressions : 150 working sheets
(1.0 percent)For additional 7 000 impressions : 52.5 working sheets
(0.75 percent)

For 32 000 impressions : 370 working sheets

NOTE—The above wastage is expected to cover the wastage for normal binding operations like folding, gathering, collating, stitching/sewing/pasting, trimming, etc. and hence no additional wastage need be given for these operations. However additional wastage for cutwork and other special operations like ruling, perforating, numbering, die stamping, foil printing, punching, etc. may be settled between the print buyer and the printer. Varnishing/lamination/graining may be treated as printing and wastage allowed as for normal printing (impression).

TABLE 2 ALLOWABLE WASTAGE, PER SIDE, PER COLOUR FOR CLOSE REGISTER LETTERPRESS, AND COMMON WORK AND CLOSE REGISTER OFFSET PROCESSES

(Clause 4.1)

SLAB No.	NO. OF IMPRESSIONS	ALLOWABLE WASTAGE, WORKING SHEETS
(1)	(2)	(3)
1	Up to 1 000	40
2	1 001 - 5 000	40+2.5 percent of slab 2
3	5 001 - 10 000	40+2.5 percent of slab 2+1.75 percent of slab 3.
4	10 001 - 25 000	40+2.5 percent of slab 1+1.75 percent of slab 3+ 1.5 percent of slab 4
5	25 001 - 50 000	40+2.5 percent of slab 2+1.75 percent of slab 3+ 1.5 percent of slab 4+1.0 percent of slab 5
6	50 001 onwards	40+2.5 percent of slab 2+1.75 percent of slab 3+ 1.5 percent of slab 4+1.0 percent of slab 5+0.75 percent of slab 6

Example :

Spoilage Allowance for Work Requiring Close Register (Containing Process Colour Work) Sheetfed Letterpress/Common Work as well as Close Register Offset Process

No. of impressions : 32 000

Up to	1 000 impressions :	40 working sheets
(including make-ready)		
For additional	4 000 impressions :	100 working sheets (2.5 percent)
For additional	5 000 impressions :	87.5 working sheets (1.75 percent)
For additional	15 000 impressions :	225.0 working sheets (1.5 percent)
For additional	7 000 impressions :	70.0 working sheets (1.0 percent)
For	32 000 impressions :	522.5 working sheets or 523 working sheets

NOTE — The above wastage is expected to cover the wastage for normal binding operations like folding, gathering, collating, stitching/sewing/pasting, trimming, etc and hence no additional wastage need be given for these operations. However, additional wastage for cutwork and other special operations like ruling, perforating, numbering, die stamping, foil printing, punching, etc, may be settled between the print buyer and the printer. Varnishing/lamination/graining may be treated as printing and wastage allowed as for normal printing (impression).

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Spoilage Formula for Paper Subcommittee, EC 10 : 5

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INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>	<i>Definition</i>
Force	newton	N	1 N = 1 kg.m/s ²
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m ²
Frequency	hertz	Hz	1 Hz = 1 c/s (s ⁻¹)
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m ²